Conserving the World's Megafauna and Biodiversity

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Conserving the world's megafauna: the fierce urgency of now

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In their critique of our call to save the world's terrestrial megafauna (Ripple et al. 2016), Ford et al. argue that we undermine broader efforts to conserve biodiversity. Their main arguments are that (1) megafauna conservation does not conserve other species; (2) megafauna already receives enough attention; (3) megafauna does not play a compelling enough ecological role to justify increased conservation efforts; (4) megafauna conservation is counterproductive by taking too big a share of conservation resources; and (5) megafauna is less imperiled than other species and over-shadows their declines.

Here we acknowledge that all aspects of biodiversity are important and that efforts to conserve megafauna are unlikely to be enough in isolation to conserve all species. We agree with Ford et al. that stronger and varied conservation approaches are necessary to conserve the earth's biodiversity. However, we deem it necessary to respond to Ford et al.'s critique by highlighting several important factors for consideration.

With respect to Ford et al.'s first and third arguments, we assert that megafauna are strong candidates, perhaps the strongest candidates amongst all vertebrates, as umbrellas for conservation (Caro 2010). This is because megafauna have slow life histories and large habitat requirements; thus, conserving megafauna means conserving large tracts of ecosystems and the diversity of species they host. In a conservation plan for the Cape Floristic Region of South Africa, the mammal conservation plan was the most space and area demanding of the various taxon-specific plans, this despite highly conservative population targets used for the medium and large mammals (Kerley et al. 2003). In addition, there is abundant evidence demonstrating that megafauna can cause direct or indirect effects on other species and ecosystem functions (Estes et al. 2011; Dirzo et al. 2014, Ripple et al. 2014, 2015). Indeed, in Point 3 of our Declaration we highlight how megafauna can affect ecosystem processes and services, and other species throughout the food web. Megafauna may not trigger ecological cascades in all systems, however we do assert that, in many instances, the loss of megafauna will cause disproportionate ecological disruption in comparison to several other taxonomic groups. Nonetheless, this assertion does not imply that specific conservation efforts that are not focused on

megafauna are not needed, or that targeted interventions that perhaps benefit only one or two large mammals are also not justified.

For the second and fourth arguments made by Ford et al., we acknowledge and are acutely aware that funding for conservation is finite and that great care is needed when considering its use. In our paper (Ripple et al. 2016), we did clearly call for additional conservation resources, so it is not just how the existing resources are allocated, but also recognition that society needs to invest more money. However, we are also aware that funding is not perfectly transferrable and that much of the support for conservation would decrease or disappear if megafauna species were made less of a focus (Kerley et al. 2003). We do however emphasize that our focus on megafauna conservation is not about discriminating against other species, but simply harnessing the potential of megafauna to achieve broad conservation outcomes. We are aware that the dire prospects facing broad swathes of the world's biodiversity are seriously worrisome. We therefore need to think very carefully about how best we allocate those resources and about what the most effective strategies are likely to be for achieving positive conservation outcomes for as many species as possible. We do agree that focusing too much effort and resources on some taxa at the expense of others is dangerous. However, we argue that megafauna have unique economic and cultural values and thus have an ability to harness public and political support for conservation. The trick is therefore to seek conservation interventions that yield the greatest bang for our buck—for megafauna, and for other species too.

We do not agree with Ford et al. in their fifth argument that megafauna is less imperiled than other species when considering all terrestrial vertebrates. The fact is that mammalian terrestrial megafauna are greatly imperiled and highly threatened when compared to other vertebrate taxa. Ripple et al. (2014, 2015) reported that 59% of the world's largest carnivores (≥ 15 kg, $n = 27$) and 60% of the world's largest herbivores (≥ 100 kg, $n = 74$) are classified as threatened with extinction based on IUCN criteria. These endangerment levels appear especially troublesome when compared to just 26% threatened for all mammals, 14% for birds, 23% for reptiles, and even 42% for amphibians, the latter is considered one of the most imperiled groups (IUCN 2015). It is also not correct to assume that all megafauna species are well studied and well loved. This lack of knowledge and interest is especially true for many of the threatened large herbivores such as the Palawan Bearded Pig (*Sus ahoenobarbus*), Oliver's Warty Pig (*Sus oliveri*), Mountain Anoa (*Bubalus quarlesi*).), White-lipped Deer (*Przewalskium albirostris*), and the recently described 110-kg tapir *Tapirus kabomani* sp. nov. (Cozzuol et al. 2013), among others (see Ripple et al. 2015, supplemental materials).

A broader concern we have with Ford et al.'s critique is that it presupposes a world where the predicament of all plant and animal species top the political agenda of most governments and is a shared concern by most people. Conservation has unfortunately become a political choice and not only a scientific exercise. Thus, while scientists may consider that "all species are equal", in the socio-political 'real' world some species are considered "more equal than others". Once granted, political support for conservation can have profound impacts on the prospects for conservation. For example, Amur tiger (*Panthera tigris altaica*) populations are recovering from quasi extinction after President Putin stated tigers were Russians' pride (Vice News 2015) or the Indian state of Gujarat praising itself for being the only state with Asiatic lions

(*P. leo persica*) (The Telegraph 2016). In Africa, several countries have set aside vast tracts of land for conservation and have a firm political commitment to preserving those lands. This is due in part to appreciation of the potential economic value of such areas and the large mammals they contain, as well as to notions of the importance of preserving natural heritage for future generations.

In other cases, political support for conservation is likely the product of popular support. Megafauna is better than most aspects of biodiversity at engendering that support, because it is considered to be so charismatic by so many people. It is simply a fact that most of the world's most captivating and popular species are megafauna. Where millions of tourists travel to Africa to observe megafauna (), there is no evidence that tourists travel to the upper reaches of the Amazon to see the world's highest diversity of fungi ().While we agree with Ford et al. that the conservation status of the human-gut microbiota is critically important and deserves scientific attention, we suspect it is unlikely to receive political attention, except when addressing human disease issues, when the focus falls on the eradication, not the conservation of pathological organisms. Furthermore, the failure to conserve the charismatic megafauna risks losing public support for conservation more broadly on the assumption that 'if conservationists cannot conserve a tiger with all the money and support we gave them, the won't be able to conserve the critically endangered pink velvet worm *Opisthopatus roseus* (). Thus, we emphasize that focusing on megafauna conservation is not discriminating against other species, but simply adopting an evidence-based approach on how to achieve greatest social and political impact.

We wrote our declaration because, despite being the most cherished species by the public, many megafauna species are steadily cruising towards extinction. We unfortunately still have not crafted the recipe to save these species and our Declaration calls for the urgent need of alternative approaches. Our rallying call is certainly not "Megafauna *über alles*" as Ford et al. suggest, but could instead be understood as a conservation interpretation of Dr. Martin Luther King Jr.'s own words: "*We are now faced with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history, there "is" such a thing as being too late. This is no time for apathy or complacency. This is a time for vigorous and positive action*." Megafauna need immediate attention, and, yes, non-megafauna do as well. We invite Ford et al. —and everyone— to join us in our efforts to save megafauna and all biodiversity as the fierce urgency is now.

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